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PRINCIPAL SOURCES AND DISPERSAL PATTERNS OF SUSPENDED PARTICULATE
MATTER IN NEARSHORE SURFACE WATERS OF THE NORTHEAST PACIFIC OCEAN
AND THE HAWAIIAN ISLANDS /

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Type I Progress Report

ERTS-1

- a. PRINCIPAL SOURCES AND DISPERSAL PATTERNS OF SUSPENDED PARTICULATE MATTER IN NEARSHORE SURFACE WATERS OF THE NORTHEAST PACIFIC OCEAN AND THE HAWAIIAN ISLANDS.

ERTS-1 Proposal No.: SR209

Subdisciplines: 5F, BH, 3I, K, 10C

- b. GSFC ID No. of P. I.: IN 011

- c. Black and white prints (both 9x9" and 20x20") that have been received from Sioux Falls Data Center have considerably lower resolution than the 9x9" positive transparencies. For example, the 9x9" transparency of image 1080-18425-7 shows equidimensional islands as small as 100 m and linear features such as breakwaters as narrow as 30 to 50 m. In contrast, on the 20x20" positive print of this image, the smallest identifiable features are 250 to 300 m in diameter. More careful processing of black and white prints is desirable so that resolution will not be decreased so greatly.

Poor scan-line registration on the images detracts from their use in stereo mode. Some sets of scan lines on one or the other image of a stereo pair are sufficiently far out of registration with adjacent sets of lines that an artifact valley or ridge is produced parallel to the scan lines when the images are viewed in stereo mode.

Black and white prints (9x9") of the coastal zone received from the Sioux Falls Data Center have much better tonal variation within the coastal waters than many of the positive transparencies (9x9") received from NASA Goddard. If the transparencies were exposed so as to show better contrast and detail of the water they would be more useful to us.

Cloudy weather is a big problem in obtaining satellite imagery of west coast test sites concurrent with ground- and water-truth data collection. Observations and measurements of some of the coastal streams by R. J. Janda during satellite orbits in the month of November, though informative, were inconclusive, as no satellite imagery was obtained owing to unfavorable weather conditions.

- d. P. D. Snavelly, Jr., and N. S. MacLeod have been studying ERTS-1 imagery of the central Oregon Coast and the Olympic Peninsula areas, where they have done extensive geologic mapping. They have found that small but geologically significant features can be more readily discerned on ERTS-1 images examined in stereo mode (e.g., images 1115-18390-7 and 1114-18331-7 of the Newport area of the Oregon coast) than on either individual image viewed separately.

P. Carlson, W. Hancock, and W. Todd collected water-truth data (turbidity, salinity, temperature, and suspended-sediment concentrations) from south San Francisco Bay and the Gulf of the Farallones during successive passes of the ERTS-1 satellite, November 29 and 30, 1972. When the imagery from these orbits is received, we shall attempt to correlate the

variations in water measurements with tonal variations on the imagery.

Plans are being made for additional water-truth measurements in San Francisco Bay and in the Gulf of the Farallones in late January and early February coincident with satellite passes. Aircraft coverage of the San Francisco Bay test site will be provided at an altitude of 25,000 feet by the C-130 aircraft from NASA, Houston. Sensors to be operated on the aircraft include four Hasselblad cameras (ERTS-1 spectral band configuration), two RC-8 cameras with IR color and color film, and an RS-14 thermal IR scanner.

At the time of satellite coverage in January of the Hawaiian Islands, ground-truth data will be collected from the drainage basins and streams on several of the islands. It is planned that low altitude reconnaissance flights also will be made, using charter aircraft.

- e. P. D. Snavely, Jr., and N. S. MacLeod report that numerous geologic features can be discerned on an image (1080-18425-7) of the north-western Olympic Peninsula, Washington, and southern Vancouver Island, British Columbia. A thick (5000 m) homoclinal sequence of north-dipping Tertiary marine strata along the northwestern Olympic Peninsula is readily discernible because of the banded nature of its outcrop.

The submarine basalt on which this sequence rests shows as a high, rugged ridge. Within the sedimentary sequence, alternating sandstone and siltstone members 100 m or more thick show in the southeast corner of the image. Broad folds in this banded sequence and faults that cut it can be detected. One large fault, the Pysht

River fault (Gower, 1960), and a large syncline in sandstone and siltstone east of it show prominently on the image. Resistant sandstone units can be seen along the coastal belt in the south-central part of the image: For example, a 100-m-thick ridge-forming unit of sandstone beds (turbidites) interbedded in less resistant siltstone east of Neah Bay and a conglomerate unit, which forms a rectangular headland at Sekiu, are readily discerned. Numerous lineations on the image of southern Vancouver Island correlate with faults shown on Muller's map (1971). Particularly prominent are the Leech River and San Juan faults along the southernmost part of the island.

Discipline 3I.

f. None

g. Improved line registration of the MSS imagery, which could be easily handled by computer processing, would greatly increase the value of selected images for photogeologic interpretation, especially for stereoscopic viewing.

h. None

i. None

j. None

k. N/A